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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,278	10/15/2001	Genji Imai	011381	1088

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EXAMINER

THORNTON, YVETTE C

ART UNIT PAPER NUMBER

1752

DATE MAILED: 07/14/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/976,278

Applicant(s)

IMAI, GENJI

Examiner

Yvette C. Thornton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-10 and 12-14 is/are rejected.
- 7) ☒ Claim(s) 4, 5 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6. 6) ☐ Other:

DETAILED ACTION

This is written in reference to application number 09/976278 filed on October 15, 2001 and published as US 2002/0068236 A1 on June 6, 2002.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The Information Disclosure Statement filed on April 28, 2003 has been entered and fully considered.

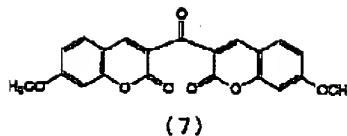
Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

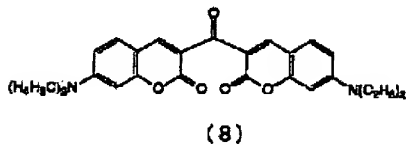
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 6, 8-10 and 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Ichimura et al. (JP 2000-035665, machine translation). Ichimura teaches a photosensitive composition comprising (A) a poly(tert-butyl methacrylate) binder; (B) an acid generator diphenyliodonium triflate; (C) a photosensitization coloring matter; (D) an acid multiplication agent 3-(p-toluenesulfonyloxy)-2-PINANORU (p. 0030); and (E) the solvent cyclohexane. The said composition was spin coated onto a silicon wafer, pre-baked, irradiated at 436 nm, post-baked and developed (p. 0037). The said photosensitization coloring matter is selected from compounds (1)-(9) (p. 00022). Specifically, compounds (7)



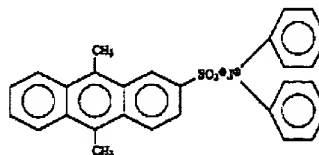
and (8) have the following structures, respectively:

and



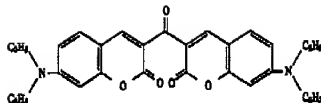
It is the examiner's position that the said structures meet the limitations of a benzopyran ring compound capable of increasing photosensitivity to visible light with a wavelength of 480 nm or more. Ichimura teaches that an acid generator sensitive to UV light can generate more by irradiation to light of long wavelength by the addition of a suitable photosensitizer (p. 0022). The taught acid multiplication agent 3-(p-toluenesulfonyloxy)-2-PINANORU meets the limitations of the claimed proliferating agent.

5. Claims 1-3, 6, 8, 10, 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Imai et al. (US b5496678 A). Imai exemplifies in example 2 a mixture consisting of polymer A2, vinyl ether compound B-2, photochemically acid generating compound C-2 and sensitizing colorant 1 (c. 16, l. 24-33). Polymer A-2 is acrylic acid/n-butyl acrylate/p-hydroxystyrene (17:37:50) copolymer having a molecular weight of about 5,200 (c. 12, l. 51-



c. 13, l. 1). Compound C-2 has the following structure:

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(c. 16, l. 51-62). Sensitizing colorant 1 has the structure:

(c. 16, l. 63-c. 17, l. 9). The said mixture was made into a solution by dissolving the said components in diethylene glycol dimethyl ether (organic solvent). The solution was spin-coated on a silicon wafer and dried at 50°C for 10 minutes to form a 3 μ m thick dry film (see also c. 10, l. 39-c. 11, l. 6). The formed substrate was irradiated using visible light at 488 nm and post-baked at 90°C for 10 minutes. Development was done with an aqueous solution containing 2.38% TMAH (c. 16, l. 35-50). See also example 5. It is the examiner's position that compound C-2 meets the limitation of the claimed photoacid generator; photosensitizing colorant 1 meets the limitation of the claimed benzopyran ring compound capable of increasing photosensitivity to visible light with a wavelength of 480 nm or more.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (US 5,496,678 A) as applied to claims 1-3, 6, 8, 10 and 12-13 above. Imai as discussed above teaches all the limitations of the instant claims except is fails to exemplify a

composition comprising a proliferating agent as set forth in instant claim 9 or a process wherein the support film is peeled off after irradiation as in instant claim 14.

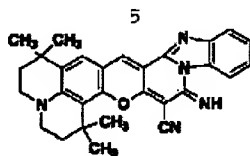
Imai does however teach that the taught composition may comprise a plasticizer (e.g., phthalic acid ester), a polyester resin, an acrylic resin etc in order to allow the resulting film to have appropriate flexibility and non-tackiness (c. 9, l. 3-17). One of ordinary skill in the art would have been motivated by the teachings of Imai to incorporate a plasticizer such as phthalic acid ester into the composition of example 2 in order to improve flexibility.

Imai further teaches that the taught photochemical compositions can be used as a dry film type resist or a transfer film type. In the dry film type resist, the taught composition is coated on a transparent and flexible supporting film. The coated solution is heated to remove the solvent thereby forming a dry film. As necessary, a protective layer maybe formed on the resist side of the said film. Alternatively, it is possible that a resist film is formed on a releasable film and then a supporting film be mounted on the resist film. The adhesivity between the supporting film and the resist film is generally 1/10 or less of the adhesivity between the supporting film and the resist film. The transfer film is prepared in the same manner as the dry film resist except that the adhesivity between the supporting film and the resist film is desirably about 1/3 or less of the adhesivity between the substrate and the resist film when it has been laminated on a substrate. In the case of the transfer film type, the supporting film is peeled off before irradiation. In the case of the dry film type resist, the supporting film is peeled off from the resist film after irradiation (c. 11, l. 7-c. 12, l. 3). It would have been obvious to one of ordinary skill in the art, in light of the teachings of Imai to use the composition of example 2 to make a transfer film wherein the supporting film

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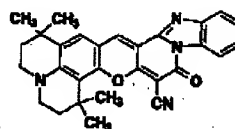
is peeled off prior to irradiation or a dry film type resist wherein the supporting film is peeled off after irradiation.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (US 5,496,678 A) as applied to claims 1-3, 6, 8, 10 and 12-13 above, and further in view of Makoto et al. (JP 09-138502 A, machine translation). Imai as discussed above teaches all the limitations of the instant claims except it fails to teach a photosensitizer having the specific structure of instant claim 7. Makoto teaches a series of benzopyran ring condensation compound guided from a 3-benzimidazolyl-2-imino coumarin compounds which show photosensitization ability to light with a wavelength of 500 nm or more (p. 0008). Specific compounds include formulae 5-6, 8-10 and 15 (p. 0016-0026). Formula 5 having the



structure:

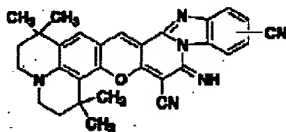
(5) meets the limitations of claimed formula (1) when



Y=NH, R1=H and R2=H. Formula 6 having the structure:

(6)

meets the limitations of claimed formula (1) when Y=O, R1=H and R2=H. Formula 8

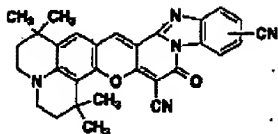


having the structure:

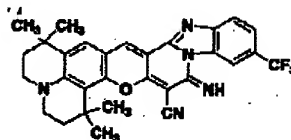
(8) meets the limitations of claimed

formula (1) when Y=NH, R1=H and R2=CN. Formula 9 having the structure:

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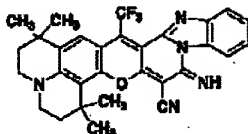
(9) meets the limitations of claimed formula (1) when Y=O,



R₁=H and R₂=CN. Formula 10 having the structure:

(10)

meets the limitations of claimed formula (1) when Y=NH, R₁=H and R₂=CF₃. Formula 15



having the structure:

(15) meets the limitations of claimed

formula (1) when Y=NH, R₁=CF₃ and R₂=H. One of ordinary skill in the art would have been motivated by the teachings of Makoto to substitute any one of the benzopyran ring condensed compounds of formulae 5-6, 8-10 and 15 for the exemplified photosensitizing colorant 1 of example 2 of Imai in order to improve the photosensitizing ability of the taught composition to visible light greater than 500 nm.

Allowable Subject Matter

9. Claims 4-5 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: review of the prior art failed to teach and/or suggest a positive photosensitive composition

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comprising a resin which has a carboxyl and/or hydroxyphenol containing resin in combination with an ether linkage-containing olefinic unsaturated compound, a photoacid generator and a photosensitizer which is a benzopyran condensed ring compound. The prior art also failed to teach a positive photosensitive composition comprising a resin, a photoacid generator and a photosensitizer, which is a benzopyran, condensed ring compound which is an aqueous resin composition.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Imai et al. (US 6,555,286 B1) which teaches positive type actinic ray curable dry film and pattern forming method by use of the same.
- Uno et al. (US 6,277,541 B1) which teaches a photosensitive lithographic printing plate.
- Imai et al. (US 6,140,025 A) which teaches a negative type photosensitive resin composition and method for forming resist pattern.
- Urano et al. (US 6,033,826 A) which teaches a polymer and resist material.
- Okamoto et al. (US 5,801,212 A) which teaches a photopolymerization composition containing a sensitizing dye and a titanocene compound.

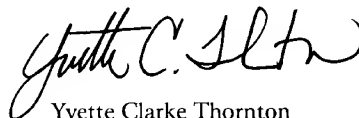
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet C. Baxter can be reached on 703-308-2303. The fax phone numbers for the

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organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

14. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.

A handwritten signature in black ink, appearing to read "Yvette C. Thornton". The signature is fluid and cursive, with the first name "Yvette" and the last name "Thornton" being more legible than the middle initial "C.".

Yvette Clarke Thornton
Junior Examiner
Art Unit 1752

yct
July 10, 2003